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REMARKS

Applicants appreciate the Examiner's thorough consideration provided in the present application.   Claims 1-10 and 21 are currently pending in the instant application.   Claim 1 has been amended and claim 21 has been added. Claims 1 and 21 are independent.   Non-elected claims 11-20 have been cancelled without prejudice or disclaimer to the subject matter contained therein.   The subject matter of additional claim 21 is fully supported by the original written description, including, but not limited to original claim 1. Reconsideration of the present application is earnestly solicited.

Priority

Applicants have claimed the benefit of U.S. Provisional Application No. 60/171,582 filed on December 23, 1999.

Drawings

Applicants appreciate the Examiner's indication of acceptance and approval of the drawings filed on March 9, 2001.

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Election/Restriction

The Examiner has made the restriction requirement mailed on December 31, 2004 final. Claims 1-10 have been elected with traverse. Claims 11-20 have been withdrawn from further consideration by the Examiner as being directed to non-elected subject matter. Applicants have cancelled claims 11-20 without prejudice or disclaimer to the subject matter contained therein. In addition, Applicants reserve the right to pursue the subject matter of claims 11-20 in a timely filed divisional application(s).

Claim Rejection Under 35 U.S.C. § 103

Claims 1-10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Jain et al. (U.S. Patent No. 6,289,112) in view of Lee et al. (U.S. Patent No. 5,822,453). This rejection is respectfully traversed.

In light of the foregoing amendments to the claims, Applicants respectfully submits that all of the rejections have been obviated and/or rendered moot. Without conceding the propriety of the Examiner's rejection, but merely to expedite the prosecution of the present application, Applicants have amended claim 1 to clarify the invention for the benefit of the Examiner. Specifically, Applicants submits that the prior art of record fails to teach or suggest each and every limitation of the unique combination of limitations of

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the claimed invention. In addition, Applicants submit that the Examiner's rejection based on Jain et al. in view of Lee et al. is improper and/or fails to establish a proper prima facie case of obviousness. Therefore, Applicants submit that the foregoing, non-narrowing amendments and following remarks have not been made to a responsive to a proper statutory rejection. Accordingly, this rejection should be withdrawn.

With respect to claim 1, the prior art of record fails to teach or suggest the combination of limitations of the claimed invention, including the feature(s) of: "generating a histogram function of *a contrast level of said image data corresponding to said at least one data block, wherein a histogram of pixel intensity on a pixel by pixel basis is generated for said at least one data block.*" (Emphasis Added) Accordingly, this rejection should be withdrawn.

With respect to claim 21, the prior art of record fails to teach or suggest the combination of limitations of the claimed invention, including the feature(s) of: "generating a histogram function of *a contrast level of said image data corresponding to said at least one data block.*" (Emphasis Added) Accordingly, this rejection should be withdrawn.

With respect to the Jain et al. reference, the Examiner has admitted that Jain et al. fail to teach or suggest the use of any histogram function of a contrast level of image data corresponding to at least one data block. The

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Examiner has alleged that Lee et al. suggests generating a histogram function. However, Applicants submit that even though Lee et al. discusses the use of histogram functions, neither Lee et al. nor Jain et al. remotely suggest the unique combination partitioning said fingerprint image data into at least one data block corresponding to a local area of said image data and generating a histogram function of a contrast level of said image data corresponding to said at least one data block. Accordingly, this rejection should be withdrawn.

The Examiner is respectfully requested to review pages 10-11 of the present application, particularly the section of the specification starting with the following discussion concerning the use of histogram functions of the background art starting at page 10, lines 3-12 of the specification:

> The histogram transform 10 of the preprocessing module 1 performs the pre-enhancement histogram transformation of the finger print image data using a simple but effective method including specially designed histograms tailored to the statistical information of fingerprint images. *Unlike conventional histogram equalization methods that use constant functions, a special function is used for global/local enhancement and adapts automatically to the histogram characteristics of each input fingerprint. The method can be implemented fast enough for on-line processing, and also gives better performance than approaches in existing systems such as in Jain et al., "On-Line Fingerprint Verification", IEEE Trans. On Pattern Recognition and Machine Intelligence, 19 (4), 302-314, 1997.* (emphasis added)

The use of histograms discussed by Lee et al. and referred to by the Examiner is not related to the generation of a histogram function of a contrast

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level of image data corresponding to the data block(s) of the claimed invention. In contrast to the claimed invention, Lee et al. use of histograms is clearly different than that of the claimed invention. Specifically, as described by Lee et al. on col. 5, lines 12-24 (col. 15, lines 18-21 does not exist in the Lee et al. reference as alleged by the Examiner on page 3 of the Office Action), Lee et al. use of histograms for only sampled pixels to enhance *scene contrast* does not rely on the generation of histogram functions for each block created from a partitioning step.

> Referring to FIG. 3, there is illustrated the step of estimating the scene contrast S40. First, two thresholds (the lower and the upper thresholds) are determined S80 for a Laplacian response, as will be illustrated in detail in FIG. 4. *Then, the two thresholds are used in deciding which pixels should be sampled from the digital image for further analysis in eventually determining the tone scale curve. A histogram K(x) derived from the sampled pixels is created S100 and its standard deviation (k) is calculated S110, where x denotes the input code value. The output k is used as an estimate of the scene contrast Output k is used as an estimate of the standard deviation because of the previously stated correlation between the standard deviation and the scene contrast.* (emphasis added)

Lee et al. specifically samples pixels only of high contrast for the generation of histograms. Accordingly, Lee et al. is not related to the claimed invention or the Jain et al. reference modified by the Examiner. The Examiner will note that in the present application, a unique method incorporates the unique combination of partitioning said fingerprint

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image data into at least one data block corresponding to a local area of

said image data *and* generating a histogram function of a contrast level

of said image data corresponding to said at least one data block data

blocks. As discussed in further detail on page 10 of the present

application,

> The histogram transform 10 [of the present application]
> performs the following pre-enhancement functions. The fingerprint
> image is partitioned into image blocks of size $S_b \times S_b$. A block may
> be formed that encompasses the entire fingerprint image or several
> blocks may be formed with each block encompassing only portions
> of the image. Histograms of pixel intensity on a pixel by pixel basis
> are generated for each block. The corresponding histogram
> function is also constructed for each block. Assuming that the
> histogram function for an image block is $g(x)$, the histogram
> transformer 10 maps histogram function of the image to a specific
> function according to the following mapping

Without conceding the propriety of the Examiner's rejection, but

merely to expedite the prosecution of the present application, Applicants

have amended claim 1 to clarify that a histogram of pixel intensity on a

pixel by pixel basis is generated for said at least one data block.

Accordingly, this rejection should be withdrawn and the present

application should be passed to Issue.

With respect to claim 21, Applicants submit that the prior art of record

fails to teach or suggest the generation of a histogram function of a contrast

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level of said image data corresponding to said at least one data block. Although Jain et al. discusses partitioning said fingerprint image data into at least one data block, Jain et al. clearly does not rely on the use of generated histogram functions with respect to these data blocks. Further, the alleged analogous histogram functions of Lee et al. fail to teach or suggest the unique combination of limitations of the claimed invention, specifically the generation of a histogram function for each of said at least one data blocks. In fact, Lee et al. is specifically directed at generating histogram functions for only sampled pixels of high contrast and therefore does not suggest the use of a histogram function for each of the partitioned data blocks as in the claimed invention. Accordingly, this rejection is improper and should be withdrawn.

In accordance with the above discussion of the patents relied upon by the Examiner, Applicants respectfully submit that these documents, either in combination together or standing alone, fail to teach or suggest the invention as is set forth by the claims of the instant application.

As to the dependent claims, Applicants respectfully submit that these claims are allowable due to their dependence upon an allowable independent claim, as well as for additional limitations provided by these claims.

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CONCLUSION

Since the remaining references cited by the Examiner have not been utilized to reject the claims, but merely to show the state-of- the-art, no further comments are deemed necessary with respect thereto.

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.
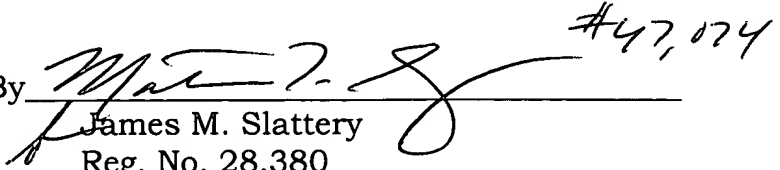
In the event there are any matters remaining in this application, the Examiner is invited to contact Matthew T. Shanley, Registration No. 47,074 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____ #47,074

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